

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of: Dan W.C. Delmer

Serial No.: 09/904,975 Art Unit: 3679

Filed: July 12, 2001 Examiner: Aaron M. Dunwoody

For: COUPLING FOR PIPE AND RELATED METHODS

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**APPEAL BRIEF UNDER 37 C.F.R. 41.37**

Appellant submits this Appeal Brief in connection with the above-referenced patent application which is on appeal to the Board of Patent Appeals and Interferences.

The Appeal Brief is accompanied by the requisite fee set forth in §41.20(b)(2).

## **STATEMENT OF THE REAL PARTY IN INTEREST**

Appellant identifies the real party in interest as the named inventor,  
Dan W.C. Delmer, an individual having a principal address at 16158 Tortola  
Circle, Huntington Beach, CA 92649.

## **STATEMENT OF RELATED CASES**

Appellant is presently unaware of any other appeals, judicial proceedings, or interferences which may be related to, directly affect, or be directly affected by, or which will have a bearing on the Board's decision in the pending appeal.

## JURISDICTIONAL STATEMENT

The Board has jurisdiction under 35 U.S.C. 134(a). The relevant dates include the following:

- On December 3, 2008, the Examiner mailed a Final Rejection, setting a three-month shortened statutory period for response. The time for responding to the Final Rejection (without any extension of time) expired on March 3, 2009.
- On April 3, 2009, Appellant filed a request for a one-month extension of time under Rule 136(a), along with a Notice of Appeal and a Pre-Appeal Brief Request for Review.
- On April 27, 2009, the Patent Office mailed a Notice of Panel Decision from Pre-Appeal Brief Review, maintaining the application under appeal.
- The deadline for filing an Appeal Brief is the greater of (a) one month from the mailing date of the Panel Decision (which would be May 27, 2009) or (b) two months after the filing of a Notice of Appeal (which would be June 3, 2009). Accordingly, the time for filing an Appeal Brief expires on June 3, 2009, and Appellant is filing this Appeal Brief on that same date.

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### STATUTES

None

### OTHER AUTHORITIES

None

## STATUS OF AMENDMENTS

An amendment filed February 3, 2009, was not entered by the Examiner.



## **GROUND OF REJECTION TO BE REVIEWED ON APPEAL**

1. Rejection of Claims 2, 5, 6, 43-47, 49 and 50 as being anticipated under 35 U.S.C. §102(e) over Graves (U.S. Patent No. 6,416,667).
2. Rejection of Claims 3, 7, 48 and 51-53 as being unpatentable under 35 U.S.C. §103(a) over Graves and Fochler (U.S. Patent No. 3,330,303).

## STATEMENT OF FACTS

1. The Examiner's anticipation and obviousness rejections ALL rely upon the Graves '667 reference.
  - 1.1. In rejecting Claims 2, 43-47, 49 and 50, the Examiner cited Graves at Figures 1-4 and elements 23 and 24 (p. 5-6 of the Final Office Action).
  - 1.2. In rejecting Claim 5, the Examiner cited Graves, but made no reference to any particular portion of Graves (p. 6 of the Final Office Action).
  - 1.3. In rejecting Claim 6, the Examiner cited Graves' sealing element 107 (see Graves' Figure 9) (p. 6 of the Final Office Action).
  - 1.4. In rejecting Claims 3, 7, 48 and 51-53, the Examiner cited Graves (but made no reference to any particular portion of Graves) and Fochler '303 (referring to line element 14 (see Fochler's Figures 1-3) and col. 3, lines 11-12) (p. 7 of the Final Office Action).
2. Appellant's claims are directed to features that are not disclosed or made obvious by Graves, Fochler, and/or any permissible combination of those references. Among other things, and as further noted below, all of the

joints disclosed or suggested by Graves involve inserting a male member having a "substantially" smaller internal diameter into a female member having greater axial height and greater diameter (col. 8, l. 10-13). Graves does not disclose or suggest joining diametrically similar female and male joint portions, or the consequent need for the female portion being temporary deformable.

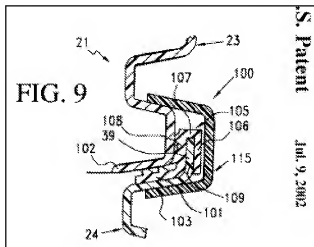
- 2.1.1. Graves describes a solids settling and retention basin that is molded from polymeric/copolymeric synthetic plastic material (Graves, col. 8, lines 1-4). In the embodiment of Graves' Figure 4, the basin includes three risers 22, 23, and 24 stacked on each other, with an access cover 46 on top of the assembly.
- 2.1.2. Graves discloses fabricating its basin risers (such as risers 22, 23, and 24) from a single tubular body having along its axial length a series of interspersed ribs and valleys. Graves' Figures 5 and 7 both show such a one-piece basin body immediately after the molding thereof. Graves, col. 5, l. 9-28.
- 2.1.3. Some of Graves' ribs (33) have substantially smaller internal diameter than others of the ribs (34), and some of the valleys (35) have greater axial height and greater diameter than others of the

valleys (36) (col. 8, l. 10-13). By removing the specific portions shown in gray in Figs. 5 and 7, the remaining pieces can be telescopically nested together as shown, respectively, in Figs. 6 and 8. Specifically, Graves discloses to seat each smaller valley 36 (Fig. 6) telescopically within the remaining wall portion 39 of a larger valley 35 (col. 8, l. 21-48).

2.1.4. In addition to requiring different sizes for its "male"/"female" mating portions 36 and 39, Graves requires a compression clamp and seal assembly 100 to join together those risers (such as risers 22, 23, and 24, or risers 41, 42, 43, and 44) (see, for example, Fig. 9; col. 10, l. 25-45). Graves devotes four separate drawings (Figs. 9-12) and nearly an entire page of specification to discussing these compression clamps and seal assemblies 100 (col. 10, l. 25 through col. 12, l. 2) and the interactions of parts of those assemblies such as an O-ring type annular seal 105 and a compression clamp 115 (col. 10, l. 43-45). Although Appellant's Claims 6 and 53 require a sealing element, and Claims 35-42 requires a stretch-holding device for joining the pipe sections, these are in dependent claims and are not required for operation

of the joint. Accordingly, Graves' clamp and seal are not patentably relevant to those features.

- 2.1.5. Details of Graves' seal 105 and clamp 115 are disclosed in Graves' Fig. 9 (copied nearby). Graves notes that his compression clamps 115 perform a number of functions: (a) compressing the seal/gasket 105 to "effect a water-tight seal"; (b) preventing vertical separation between the risers 23 and 24;



- (c) maintaining horizontal alignment of the risers; and  
(d) "creating in effect two seals [using portions of the annular seal or gasket 105], one afforded by the inner cylindrical leg portion 108 and the other by the radially inwardly directed wall portion 101" (col. 11, l. 38-45).

2.1.6. Further regarding those clamp and seals, Graves discloses the need to use a screwdriver or other tool to tighten the clamp 155 against the gasket's leg portion 106 (Fig. 9) to eventually create additional water-tight seals: (a) one between the clamp 115 and the gasket leg portion 106 and (b) the other between the sealing lips (unnumbered ) and the opposing wall portion 39 of the valley 36 (col. 11, l. 13-33). Thus, Graves' clamp 115 is compressed to provide sealing at various locations (e.g., 101, 108, and 106) along the length of the gasket 105.

2.1.7. Graves does not describe any part of its various ribs and valleys as being temporarily deformable. Graves does not describe any need to temporarily deform any part of its various ribs and valleys. Instead, as noted above, Graves simply discloses and describes stacking pieces on top of each other, and assembling them by setting a smaller valley 36 (on the bottom of an "upper" piece of pipe) within a larger valley 39/35 (on the top of a "lower" piece of pipe) (Graves, col. 8, lines 42-48 and Figure 6, elements 49, 36, 39 and 35). To hold those stacked pieces

together, Graves discloses to use the aforementioned separate clamp and seal structures.

2.1.8. Even Graves' cover guard 45 has a smaller outside diameter that fits within the larger diameter of the valley 39/35 (on the top of a "lower" piece of pipe) (see Figs. 4-6; col. 8, l. 30-39).

2.1.9. Graves describes a middle tubular section with a first end containing a wall portion of a larger valley for joining with the wall portion of a smaller valley of the upper tubular section; and a second end different from the first end containing a wall portion of a smaller valley for joining with the wall portion of a larger valley of a bottom tubular section (Graves, col. 9, lines 52-67 and Figure 4, elements 23 and 39). Graves does not describe a second piece of pipe that includes a second female engagement structure remote from the first female engagement structure, the second female engagement structure being temporarily deformed to function as a female structure for receiving a corresponding non-deformed end of a third piece of pipe. Instead, Graves describes a bottom tubular section (Graves, col. 10, lines 49-55 and Figure 4, element 24).

- 2.1.10. Graves describes internally projecting ribs to suspendingly support the wastewater treatment mechanism within Graves' solids settling and retention basin (Graves, col. 9, line 52 to col. 10, line 5). Graves does not describe providing an internal non-corrugated liner element in his solids settling and retention basin.
- 2.1.11. Fochler describes an inner tube to serve as a support for the surrounding outer tubing of a composite tubing structure for the transmission of electricity (Fochler, col. 3, lines 11-12).
- 2.1.12. The level of skill in the art is such that it would not be obvious to combine Graves' solids settling and retention basin with Fochler's electrical tubing structure to achieve Appellant's claimed apparatus for joining a plurality of pieces of pipe.
3. Among the features of Appellant's claimed inventions that are not disclosed or made obvious (by Graves, Fochler, and/or any permissible combination thereof) some are underlined below:
- 3.1. **Claim 2:** Apparatus for joining a plurality of pieces of pipe, including: a first piece of pipe and a second piece of pipe each having a similar size and shape sidewall corrugation pattern along their lengths, said corrugation including a generally repeating sinusoidal



pattern in cross section having alternating portions (a) radially more distant from a longitudinal centerline of the pipe and (b) radially less distant from that centerline; a male engagement structure formed from the sidewall corrugation pattern of the first piece of pipe, said male engagement structure terminating longitudinally at a location along the corrugation pattern that is generally within the radially less distant portion of the corrugation pattern; and a first female engagement structure formed from the sidewall corrugation pattern of the second piece of pipe, said female engagement structure terminating longitudinally with a generally open end for receiving the male engagement structure, said termination occurring at a location along the corrugation pattern that is generally within the radially more distant portion of the corrugation pattern, the first female structure being temporarily deformable to receive the male structure, the temporary deformation being both sufficiently large to permit the insertion of the male structure but also sufficiently small to ensure that material memory returns the first female structure toward its original non-deformed configuration with sufficient compressive

force to grip the male structure and to help prevent its inadvertent removal from engagement with the first female structure.

- 3.2. **Claim 43:** A pipe section, said pipe section including a generally longitudinal axis parallel to the flowpath through the pipe section; said pipe section further including a generally sinusoidal exterior surface such that, in section view along the length of the longitudinal axis, said exterior surface forms a generally sinusoidal pattern of alternating similarly-shaped and similarly-sized (a) rung elements and (b) valley portions; said valley portions generally spacing said rung elements from one another longitudinally with respect to the pipe section's longitudinal axis; said rung elements generally formed in cross section by a central portion lying generally parallel to the valley portion and spaced radially outwardly therefrom, said central portion having in cross section first and second opposing edges spaced longitudinally from each other along the longitudinal axis, said rung elements further generally formed in cross section by first and second leg portions, each leg portion respectively connecting the corresponding edge of the rung central portion to an adjacent valley; a female flange portion at one end of the pipe section, said female

flange comprising a portion of a rung including the rung's central portion, said female flange configured to receive a similarly sized and shaped rung element on the end of a similar second pipe section.

- 3.3. **Claim 49:** A pipe section, said pipe section including a generally longitudinal axis parallel to the flowpath through the pipe section; said pipe section further including a generally sinusoidal exterior surface such that, in section view along the length of the longitudinal axis, said exterior surface forms a generally sinusoidal pattern of alternating similarly-shaped and similarly-sized (a) rung elements and (b) valley portions; said valley portions generally spacing said rung elements from one another longitudinally with respect to the pipe section's longitudinal axis; said rung elements generally formed in cross section by a central portion lying generally parallel to the valley portion and spaced radially outwardly therefrom, said central portion having in cross section first and second opposing edges spaced longitudinally from each other along the longitudinal axis, said rung elements further generally formed in cross section by first and second leg portions, each leg portion respectively connecting the corresponding edge of the rung central portion to an adjacent valley;

said pipe section terminated generally at each of its two ends with a male end formed generally by a rung element.

- 3.4. **Claim 50:** Apparatus for joining a plurality of pieces of pipe, including: a first piece of pipe and a second piece of pipe each having a similar size and shape sidewall corrugation pattern along their lengths, and each including a generally longitudinal axis parallel to the flowpath through the respective pipe pieces; the sidewall corrugation of each of said pipe pieces comprising a generally sinusoidal exterior surface such that, in section view along the length of the longitudinal axis, said exterior surface forms a generally sinusoidal pattern of alternating similarly-shaped and similarly-sized (a) rung elements and (b) valley portions; said valley portions generally spacing said rung elements from one another longitudinally with respect to the pipe piece's longitudinal axis; said rung elements generally formed in cross section by a central portion lying generally parallel to the valley portion and spaced radially outwardly therefrom, said central portion having in cross section first and second opposing edges spaced longitudinally from each other along the longitudinal axis, said rung elements further generally formed in

cross section by first and second leg portions, each leg portion respectively connecting the corresponding edge of the rung central portion to an adjacent valley; a male engagement structure at one end of the second piece of pipe, said male structure formed from the sidewall corrugation pattern of the second piece of pipe, a first female structure formed from the sidewall corrugation pattern of the first piece of pipe at one end of the pipe, said female flange comprising a portion of a rung including the rung's central portion, said female flange configured to receive the male engagement structure of the second pipe piece by being temporarily deformed for receiving the male structure, the temporary deformation being both sufficiently large to permit the insertion of the male structure but also sufficiently small to ensure that material memory returns the first female structure toward its original non-deformed configuration with sufficient compressive force to grip the male structure and prevent its inadvertent removal from engagement with the first female structure.

## ARGUMENT

### **I. The Examiner has Failed to Establish that Claims 2, 5, 6, 43-47, 49 and 50 are anticipated by Graves under 35 U.S.C. §102(e)**

Appellant respectfully submits that the Examiner has not established a *prima facie* case of anticipation in rejecting Claims 2, 5, 6, 43-47, 49 and 50 under 35 U.S.C. §102(e). Among other things, (A) Graves does not teach all of the limitations of independent Claims 2, 43, 49, and 50, and (B) the Examiner has failed to show that a characteristics of the claims not disclosed in the Graves reference are inherent (Pre-Appeal Brief Request for Review filed April 3, 2009, page 1, para. 3).

The Examiner bears the initial burden of establishing a *prima facie* case of anticipation by pointing out where all the claim limitations appear in a single reference. *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655 (Fed. Cir. 1990). In addition, a claim is anticipated only if each and every element as set forth in the claim is expressly or inherently described in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987) (Pre-Appeal Brief Request for Review filed April 3, 2009, page 1, para. 4).

As indicated above and as discussed further below, Graves does not disclose or suggest Appellant's claimed feature of joining diametrically similar female and male joint portions, or the related female portion that is temporarily deformable to receive the male structure.

**A. Graves does not anticipate Claims 2, 5, 6, 43-47, 49 and 50, since Graves does not teach all of the limitations of the claims**

Among the limitations not disclosed by Graves are those underlined below in the pending independent claims 2, 43, 49, and 50:

- **Claim 2:** Apparatus for joining a plurality of pieces of pipe, including: a first piece of pipe and a second piece of pipe each having a similar size and shape sidewall corrugation pattern along their lengths, said corrugation including a generally repeating sinusoidal pattern in cross section having alternating portions (a) radially more distant from a longitudinal centerline of the pipe and (b) radially less distant from that centerline; a male engagement structure formed from the sidewall corrugation pattern of the first piece of pipe, said male engagement structure terminating longitudinally at a location along the corrugation pattern that is generally within the radially less distant portion of the corrugation

pattern; and a first female engagement structure formed from the sidewall corrugation pattern of the second piece of pipe, said female engagement structure terminating longitudinally with a generally open end for receiving the male engagement structure, said termination occurring at a location along the corrugation pattern that is generally within the radially more distant portion of the corrugation pattern, the first female structure being temporarily deformable to receive the male structure, the temporary deformation being both sufficiently large to permit the insertion of the male structure but also sufficiently small to ensure that material memory returns the first female structure toward its original non-deformed configuration with sufficient compressive force to grip the male structure and to help prevent its inadvertent removal from engagement with the first female structure.

- **Claim 43:** A pipe section, said pipe section including a generally longitudinal axis parallel to the flowpath through the pipe section; said pipe section further including a generally sinusoidal exterior surface such that, in section view along the length of the longitudinal axis, said exterior surface forms a generally sinusoidal



pattern of alternating similarly-shaped and similarly-sized (a) rung elements and (b) valley portions; said valley portions generally spacing said rung elements from one another longitudinally with respect to the pipe section's longitudinal axis; said rung elements generally formed in cross section by a central portion lying generally parallel to the valley portion and spaced radially outwardly therefrom, said central portion having in cross section first and second opposing edges spaced longitudinally from each other along the longitudinal axis, said rung elements further generally formed in cross section by first and second leg portions, each leg portion respectively connecting the corresponding edge of the rung central portion to an adjacent valley; a female flange portion at one end of the pipe section, said female flange comprising a portion of a rung including the rung's central portion, said female flange configured to receive a similarly sized and shaped rung element on the end of a similar second pipe section.

- **Claim 49:** A pipe section, said pipe section including a generally longitudinal axis parallel to the flowpath through the pipe section; said pipe section further including a generally sinusoidal exterior

surface such that, in section view along the length of the longitudinal axis, said exterior surface forms a generally sinusoidal pattern of alternating similarly-shaped and similarly-sized (a) rung elements and (b) valley portions; said valley portions generally spacing said rung elements from one another longitudinally with respect to the pipe section's longitudinal axis; said rung elements generally formed in cross section by a central portion lying generally parallel to the valley portion and spaced radially outwardly therefrom, said central portion having in cross section first and second opposing edges spaced longitudinally from each other along the longitudinal axis, said rung elements further generally formed in cross section by first and second leg portions, each leg portion respectively connecting the corresponding edge of the rung central portion to an adjacent valley; said pipe section terminated generally at each of its two ends with a male end formed generally by a rung element.

- **Claim 50:** Apparatus for joining a plurality of pieces of pipe, including: a first piece of pipe and a second piece of pipe each having a similar size and shape sidewall corrugation pattern along

their lengths, and each including a generally longitudinal axis parallel to the flowpath through the respective pipe pieces; the sidewall corrugation of each of said pipe pieces comprising a generally sinusoidal exterior surface such that, in section view along the length of the longitudinal axis, said exterior surface forms a generally sinusoidal pattern of alternating similarly-shaped and similarly-sized (a) rung elements and (b) valley portions; said valley portions generally spacing said rung elements from one another longitudinally with respect to the pipe piece's longitudinal axis; said rung elements generally formed in cross section by a central portion lying generally parallel to the valley portion and spaced radially outwardly therefrom, said central portion having in cross section first and second opposing edges spaced longitudinally from each other along the longitudinal axis, said rung elements further generally formed in cross section by first and second leg portions, each leg portion respectively connecting the corresponding edge of the rung central portion to an adjacent valley; a male engagement structure at one end of the second piece of pipe, said male structure formed from the sidewall corrugation

pattern of the second piece of pipe, a first female structure formed from the sidewall corrugation pattern of the first piece of pipe at one end of the pipe, said female flange comprising a portion of a rung including the rung's central portion, said female flange configured to receive the male engagement structure of the second pipe piece by being temporarily deformed for receiving the male structure, the temporary deformation being both sufficiently large to permit the insertion of the male structure but also sufficiently small to ensure that material memory returns the first female structure toward its original non-deformed configuration with sufficient compressive force to grip the male structure and prevent its inadvertent removal from engagement with the first female structure.

Relevant to the claims above, Graves does not disclose or suggest joining diametrically similar female and male joint portions, or the consequent need for the female portion being temporary deformable. As noted above, Graves instead specifically discloses ribs (33) that have substantially smaller internal diameter than others of the ribs (34), and valleys (35) that have greater axial height and greater diameter than other

valleys (36) (col. 8, l. 10-13). To "join" Graves' risers, Graves teaches to seat those smaller valley portions 36 (Fig. 6) telescopically within the remaining wall portion 39 of a larger valley 35 (col. 8, l. 21-48), and because Graves' "seating" of these parts does not actually "join" the parts to each other, Graves requires a separate compression clamp and seal assembly 100 at each joint (to join together the risers such as risers 22, 23, and 24, or risers 41, 42, 43, and 44; see, for example, Fig. 9; col. 10, l. 25-45).

In addition, Appellant respectfully submits that at least independent Claims 43, 49 and 50 contain limitations not disclosed in Claim 2 which further distinguish Appellant's claimed inventions over the Graves' patent teachings. For instance, Appellant respectfully submits that Claims 43, 49 and 50 require "a pattern of alternating *similarly-shaped and similarly-sized* (a) rung elements and (b) valley portions". Appellant respectfully submits that Graves does not disclose or suggest a pattern of alternating *similarly-sized and similarly-shaped* rungs and valleys, and thus cannot be said to anticipate or render obvious Appellant's claimed inventions.

Among other things, as Appellant previously pointed out to the Examiner (Amendment filed February 3, 2009, page 9, line 18 – page 10, line 4), Graves discloses at most a series *varying* sized and shaped "ribs" and

“valleys”. In that regard, Graves’ ribs and valleys are not a “pattern of alternating *similarly-shaped and similarly-sized*” rungs and valleys, as claimed in Claims 43 and 49. Instead, Graves discloses “ribs” 33 and 34 of unlike diameters, and “valleys” 35 and 36 of unlike diameters and heights (Graves, col. 8, lines 10-13). In other words, Graves’ discloses a complicated and/or even random interspersing of (a) large and small ribs and (b) large and small valleys. Accordingly, Graves cannot anticipate or render obvious Appellant’s claimed inventions since Graves does not disclose *similarly-shaped and similarly-sized* rung and valley elements.

In addition, it appears that in the December 3, 2008 Final Office Action, the Examiner further rejected Claim 43 based on limitations of Claim 2. Specifically, the Examiner states that Graves teaches a first female engagement structure being temporarily deformable (page 6, para. 2, Final Office Action dated December 3, 2008). In response, Appellant has previously noted that Claim 43 contains the limitation “a female flange configured to receive a *similarly sized and shaped* rung element on the end of a similar second pipe section”, which even further distinguishes Appellant’s claimed invention from Graves’ teachings (Amendment filed February 3, 2009, page 3, lines 8-14). Among other things, Appellant has

previously pointed out that Graves does not teach joining together *similarly-sized and similarly-shaped* joint portions, but rather joining together a large “female” joint portion 39 with a small “male” joint portion 49 (Amendment filed February 3, 2009, page 2, para. 3 to end of page 3). Appellant respectfully submits that, despite the Examiner’s assertions to the contrary, Graves’ “female” 39 and “male” 49 joint portions have *dissimilar* size and shape (Graves, Figures 4 and 6, elements 39 and 49). Specifically, Graves teaches that “the valleys 35 are of greater axial height and greater diameter than the axial height and diameter of the valleys 36....a cylindrical wall portion 49 of each smaller valley 36 (FIG. 6) will telescopically seat within the remaining portion of the wall portion 39 of the larger valley 35” (Graves, col. 8, lines 11-13 and lines 42-45), further evidencing that Graves’ female and male joint portions have unlike diameters. In other words, Graves does not disclose or suggest that his “female” joint portion is configured to receive a *similarly sized and shaped* “male” joint portion. Accordingly, Appellant respectfully submits that Graves does not anticipate or render obvious Appellant’s claimed inventions.

Furthermore, the Examiner states that the Graves reference teaches the first female engagement structure being temporarily deformable to receive

the male structure, the temporary deformation being both sufficiently large to permit the insertion of the male structure but also sufficiently small to ensure that material memory returns the first female structure toward its original non-deformed configuration with sufficient compressive force to grip the male structure and to help prevent its inadvertent removal from engagement with the first female structure (page 6, para. 2, Final Office Action dated December 3, 2008). In response, Appellant previously pointed out to the Examiner why the Examiner is believed to have erred (Amendment filed February 3, 2009, page 4, line 1 to page 7, line 8). As Appellant previously noted in his response, Graves does not disclose or suggest providing a material with temporary deformation and/or shape memory properties. Indeed, Graves does not mention any temporary deformation and/or shape memory properties of the material used in Graves' risers. Since Graves teaches joining together dissimilar portions of tubing, there is no motivation or need to provide material with any temporary deformation and shape memory properties -- Graves' smaller valley portions 49 readily "telescopically seat" within larger valley portions 39 without having to deform any of the portions. In other words, since Graves' smaller joint portions readily fit within Graves' larger joint portions (as taught by



Graves himself), larger joint portions do not have to be deformed in order to fit over smaller joint portions (even if Graves' material *could* be deformed), and indeed apparently are NOT deformed in any way in Graves' disclosure.

The material of Appellant's device, on the other hand, is specifically selected for its required temporary deformation and shape memory properties. Accordingly, Graves does not anticipate or render obvious Appellant's claimed inventions.

**B. Graves does not anticipate Claims 2, 5, 6, 43-47, 49 and 50, since the Examiner has failed to show that a characteristic not disclosed in Graves is inherent**

Rejections based on inherency must provide extrinsic evidence which makes clear that the missing descriptive matter is necessarily present in the thing described in the alleged anticipatory reference and that it would be recognized by a person of ordinary skill in the art. *Atlas Power Co. v. IRECO, Inc.*, 190F.3d 1342, 1349, 51 USPQ 1943 (Fed. Cir. 1990). In the present case, the Examiner has failed to provide (and indeed cannot provide) any such *prima facie* showing of inherency to support the anticipation rejection (Pre-Appeal Brief Request for Review filed April 3, 2009, pages 2-3, section B2).

In that regard, the Examiner has asserted that since the Graves reference teaches a female structure formed from a polymeric/copolymeric material, it inherently has the ability to temporarily deform to receive the male structure (page 11, par. 3, Final Office Action dated December 3, 2008). In response, Appellant previously pointed out to the Examiner why the Examiner is believed to have erred (Pre-Appeal Brief Request for Review filed April 3, 2009, pages 2-3, section B2). As Appellant previously noted in his response, the Examiner has failed to show that a characteristic not disclosed in the Graves reference is inherent (specifically, temporary deformation and/or shape memory properties of the material).

Specifically, even if it were a fact that Graves' material *could* be deformed, and even if that deformability would be recognized by a person of ordinary skill in the art, Appellant respectfully submits that is not sufficient to meet the requirement for an "inherency" anticipation rejection. Among other things, that required deformability is not *inherent* in practicing Graves' teachings (no deformation is necessary because Graves specifically teaches joining together sections that have *dissimilar* diameters). Graves teaches to specifically mold a unitary structure (see Graves' Figs. 5 and 7) that HAS rungs and valleys with differing sizes within it, and to specifically remove

certain portions of that unitary structure so that each of the remaining pieces will have one of the SMALLER rungs/valleys at its bottom and one of the LARGER rungs/valleys at its top.

As also noted above, Graves goes to substantial lengths to provide a separate means that actually "joins" Graves' risers to each other. In addition to seal the joint, the clamps 115 are actually the elements that "join" the risers to each other (by (b) preventing vertical separation between the risers 23 and 24, and (c) maintaining horizontal alignment of the risers, as noted above). Accordingly, Appellant's Claims 2 and 50 (which require "Apparatus for joining a plurality of pieces of pipe") differs patentably from Graves for that reason alone.

Moreover, given those express teachings, it would be contrary to common sense or "inherency" to deform any of the sections to fit them together since they readily "telescopically seat" together. In other words, it is not "inherent" in practicing Graves to deform ANY portion of Graves' riser/rung/valley/etc. Accordingly, Appellant respectfully submits that Graves does not anticipate or render obvious Appellant's claimed inventions.

**II. The Examiner has Failed to Establish that Claims 3,7, 48 and 51-53 are unpatentable over Graves in view of Fochler under 35 U.S.C.**

**§103(a)**

Appellant respectfully submits that the Examiner has not established a *prima facie* case of obviousness in rejecting Claims 3, 7, 48 and 51-53 under 35 U.S.C. §103(a) since (A) neither Graves, Fochler, nor any permissible combination of them teaches all of the features of the claimed invention, and (B) the Examiner has failed to explain why one of ordinary skill in the art would be led to combine the teachings of Graves and Fochler (Pre-Appeal Brief Request for Review filed April 3, 2009, page 3, para. 3).

As with rejections under 35 U.S.C. 102, the Examiner bears the burden of establishing a *prima facie* case of obviousness based on the prior art when rejecting the claims under 35 U.S.C. 103. *In re Fritch*, 972 F.2d 1260, 23 U.S.P.Q.2d 1780 (Fed. Cir. 1992). In addition, all limitations of the claimed invention must be considered when determining patentability. *In re Lowry*, 32 F.3d 1579, 1582, 32 U.S.P.Q.2d 1031, 1034 (Fed. Cir. 1994). Therefore, no *prima facie* obviousness rejection can be established if the proposed combination does not teach all of the features of the claimed

invention (Pre-Appeal Brief Request for Review filed April 3, 2009, pages 3-4, section C1).

**A. Even if Combined, the Cited References do not teach all of the features of the claimed invention**

In the Final Office Action dated December 3, 2008, the Examiner asserts that Graves in view of Fochler discloses the invention as claimed in Claims 3, 7, 48, and 51-53 (as those depend from independent Claims 2, 43, 49 and 50 that the Examiner rejected on the basis of Graves, and Fochler allegedly shows the further elements of these dependent claims).

Regarding Claims 3, 48, and 51, the Examiner asserts that Fochler includes an internal non-corrugated liner element; as for Claim 7, an adhesive material acting between confronting surfaces of the first and second pieces of pipe; for Claim 52, a butt joint providing a substantially smooth interior transition surface longitudinally between the respective pipe elements; and for Claim 53, a sealing gasket element (pages 7 - 8, Final Office Action dated December 3, 2008).

In response, Appellant previously pointed out to the Examiner why the Examiner is believed to have erred (Pre-Appeal Brief Request for Review filed April 3, 2009, pages 3-4, section C1). As Appellant previously

noted in his response, and as noted above, Graves does not teach aspects of Appellant's claimed inventions such as " similarly-shaped and similarly-sized (a) rung elements and (b) valley portions" that interfit to join two pieces of pipe. Fochler does not provide any assistance to the Examiner's position on that issue, in that Fochler merely discloses butt joints (such as in Fig. 7) or a conventional bell and spigot joint (see Figs. 4 and 5, and col. 3, l. 75 through col. 4, l. 8).

Accordingly, Appellant respectfully submits that neither Graves, Fochler, nor any permissible combination of the references discloses or makes obvious Appellant's claimed inventions since they do not disclose all of the features of Appellant's claimed invention.

**B. The Examiner has failed to articulate any reason why one of ordinary skill in the art would be led to combine the teachings of the references (or that they even CAN be combined)**

Appellant submits that rejections based on obviousness cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness. *Teleflex Inc. v. KSR Int'l Co.*, 550 U.S. at 1,82 USPQ2d at 1396 (2007). In the present case, Appellant has previously

pointed out that the Examiner fails to state a *prima facie* case of obviousness since the Examiner fails to provide articulated reasons as to why one of ordinary skill in the art would be led to combine the teachings of the references (Pre-Appeal Brief Request for Review filed April 3, 2009, pages 4-5, section C2). As Appellant previously noted in his response, although the Examiner cites Fochler as disclosing “an internal non-corrugated liner element to support the surrounding outer corrugated tube” and asserts that it would be obvious to combine the references since Fochler relates to composite tubing structures (page 7, Final Office Action dated December 3, 2008), to combine the references in this manner would be contrary to the teachings of Graves.

As Appellant has previously pointed out, Graves discloses an express reason that Graves does NOT include a smooth interior surface such as taught by Fochler: one purpose of Graves’ internally projecting ribs is to suspendingly support the wastewater treatment mechanism within the solids settling and retention chamber of the solids settling and retention basin (Graves, col. 9, line 52 to col. 10, line 5). Apparently, Graves purposely does not provide a liner element (or a smooth interior pipe surface) because Graves’ internally projecting ribs appear to be an essential component of his

solids settling and retention basin. In other words, combining Fochler's liner with Graves retention basin apparently would be contrary to Graves, as it would defeat (or at least reduce) the effectiveness of the setting/retention function of Graves' internal ribs.

Accordingly, Graves not only fails to teach or suggest providing a liner element in his solids settling and retention basin, Graves teaches directly against providing such a liner. Accordingly, one of ordinary skill in the art would have not been motivated to combine Fochler with Graves to provide an internal non-corrugated liner element as proposed by the Examiner since Graves teaches only to provide internally projecting (i.e., corrugated) ribs.

In addition, the Examiner cites Graves in view of Fochler as disclosing (1) “the confronting ends of the respective internal non-corrugated liner elements of the respective pieces of pipe generally form a butt joint with each other, the butt joint providing a substantially smooth interior transition surface longitudinally between the respective pipe elements”, (2) “a sealing gasket element between the confronting ends of the respective internal non-corrugated liner elements of the respective pieces of pipe” (page 7, Final Office Action dated December 3, 2008), and (3) “an



adhesive material acting between confronting surfaces of said first and second pieces of pipe” (page 8, Final Office Action dated December 3, 2008). As Appellant has previously noted in his response and sets forth above, the Examiner has failed to provide articulated reasoning for combining Graves with Fochler to provide an internal non-corrugated liner (and Graves in fact teaches against such a combination, as noted above). Accordingly, there is no motivation to combine Graves with Fochler to provide additional features of an internal non-corrugated liner.

Accordingly, Appellant respectfully submits that neither Graves, Fochler, nor any permissible combination of those references discloses or makes obvious Appellant’s claimed inventions.

## CONCLUSION

Appellant respectfully submits that the stated rejections cannot be maintained, in view of the arguments set forth above or otherwise.

Appellant respectfully submits that all of the pending Claims 2, 3, 5-7 and 35-53 are patentable over the references cited by the Examiner, and

Appellant respectfully requests that the Board of Patent Appeals and Interferences direct allowance of the rejected claims.

Respectfully submitted,

Date: June 3, 2009

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**APPENDIX**  
**(a) CLAIMS SECTION**

1. (Canceled)

2. (Rejected) Apparatus for joining a plurality of pieces of pipe, including:

a first piece of pipe and a second piece of pipe each having a similar size and shape sidewall corrugation pattern along their lengths, said corrugation including a generally repeating sinusoidal pattern in cross section having alternating portions (a) radially more distant from a longitudinal centerline of the pipe and (b) radially less distant from that centerline;

a male engagement structure formed from the sidewall corrugation pattern of the first piece of pipe, said male engagement structure terminating longitudinally at a location along the corrugation pattern that is generally within the radially less distant portion of the corrugation pattern; and

a first female engagement structure formed from the sidewall corrugation pattern of the second piece of pipe, said female engagement structure terminating longitudinally with a generally open end for receiving the male engagement structure, said termination occurring at a location

along the corrugation pattern that is generally within the radially more distant portion of the corrugation pattern,

the first female structure being temporarily deformable to receive the male structure, the temporary deformation being both sufficiently large to permit the insertion of the male structure but also sufficiently small to ensure that material memory returns the first female structure toward its original non-deformed configuration with sufficient compressive force to grip the male structure and to help prevent its inadvertent removal from engagement with the first female structure.

3. (Rejected) The apparatus of Claim 2 or Claim 50, in which said pipe sidewall corrugation pattern of each piece of pipe includes a corrugated exterior surface and an internal non-corrugated liner element.

4. (Canceled)

5. (Rejected) The apparatus of Claim 2, in which said first piece of pipe includes a second female engagement structure remote from said first female structure, said second female structure also being temporarily deformed to function as a female structure for receiving a corresponding non-deformed end of a third piece of pipe, said third piece of pipe having a sidewall

corrugation pattern along its length that is similar in size and shape to the sidewall corrugation pattern of said first and second pieces of pipe.

6. (Rejected) The apparatus of Claim 2, including a sealing element positioned between confronting surfaces of said first and second pieces of pipe to help provide a watertight seal therebetween.

7. (Rejected) The apparatus of Claim 2, including an adhesive material acting between confronting surfaces of said first and second pieces of pipe to bond said first and second pieces to each other upon insertion of said second piece into said female structure of said first piece of pipe.

8 – 34. (Canceled)

35. (Rejected) The apparatus of Claim 2, in combination with a stretching tool having a channel formed to receive an edge of said first piece of pipe in the pipe's originally fabricated shape, said stretching tool including means to temporarily deform said edge of said first piece of pipe.

36. (Rejected) The apparatus of Claim 35, including a plurality of rollers positionable along the inside and outside surfaces of said edge of said first piece of pipe, and further including means for exerting force to act between said rollers and said edge to deform said edge from its originally fabricated shape to eventually form a first female end.

37. (Rejected) The apparatus of Claim 2, in combination with a temporary stretch-holding device, said stretch-holding device including a first portion for temporary insertion into said temporarily deformed female structure of said first pipe piece, said first portion being sized and configured to hold said female structure in a size that is (a) sufficiently larger than its originally fabricated shape to permit eventual insertion of a non-deformed end of said second piece of pipe in place of said stretch-holding device and (b) sufficiently small that the material memory action of said female structure will be retained to cause said female structure to reduce toward its original size upon removal of said stretch-holding device from said female structure.

38. (Rejected) The apparatus of Claim 37, in which said temporary stretch-holding device is fabricated with a sidewall corrugation pattern that is similar in size and shape to the sidewall corrugation pattern of said first piece of pipe, and further including a second portion to assist in desired removal of said device from said temporary insertion into said deformed female structure, said first portion includes a circumferential gap to allow a degree of compression of said corrugation pattern to facilitate the desired insertion into and removal from said female structure.

39. (Rejected) The apparatus of Claim 37, in which said temporary stretch-holding device is fabricated with a sidewall corrugation pattern that is similar in size and shape to the sidewall corrugation pattern of said first piece of pipe, and further including a second portion to assist in desired removal of said device from said temporary insertion into said deformed female structure, said second portion includes an axially lengthwise cut to allow a degree of compression of said temporary stretch-holding device to facilitate the desired insertion into and removal from said female structure.
40. (Rejected) The apparatus of Claim 37, further including a second portion having a strap element upon which force can be exerted to effect the desired removal of said temporary stretch-holding device from said deformed female structure.
41. (Rejected) The apparatus of Claim 37, further including a second portion having a grippable area upon which force can be exerted to effect the desired removal of said temporary stretch-holding device from said deformed female structure.
42. (Rejected) The apparatus of Claim 37, wherein said temporary stretch-holding device is sized and configured for use as a cover over a pipe joint

formed with said female structure after said device is removed from said temporary engagement within said female structure.

43. (Rejected) A pipe section, said pipe section including a generally longitudinal axis parallel to the flowpath through the pipe section; said pipe section further including a generally sinusoidal exterior surface such that, in section view along the length of the longitudinal axis, said exterior surface forms a generally sinusoidal pattern of alternating similarly-shaped and similarly-sized (a) rung elements and (b) valley portions; said valley portions generally spacing said rung elements from one another longitudinally with respect to the pipe section's longitudinal axis; said rung elements generally formed in cross section by a central portion lying generally parallel to the valley portion and spaced radially outwardly therefrom, said central portion having in cross section first and second opposing edges spaced longitudinally from each other along the longitudinal axis, said rung elements further generally formed in cross section by first and second leg portions, each leg portion respectively connecting the corresponding edge of the rung central portion to an adjacent valley;

a female flange portion at one end of the pipe section, said female flange comprising a portion of a rung including the rung's central portion,



said female flange configured to receive a similarly sized and shaped rung element on the end of a similar second pipe section.

44. (Rejected) The pipe section of Claim 43, in which said female flange is formed as an end of the pipe section generally sinusoidal pattern that is terminated generally at or near an longitudinally outermost edge of the central portion of a rung.

45. (Rejected) The pipe section of Claim 43, in which said pipe section includes at the end opposite the female end a male end, said male end formed as an end of the pipe section generally sinusoidal pattern that is terminated generally adjacent a rung near the transition of the leg of the rung into the adjacent valley.

46. (Rejected) The pipe section of Claim 43, in which said pipe section includes at the end opposite the female end a second female end similar to the first female end already described.

47. (Rejected) The pipe section of Claim 43, in which said pipe section female end is formed from a material that (a) permits sufficient expansion of that female end to receive a corresponding male end and (b) has sufficient material memory to snugly engage a male end after it has been so inserted.

48. (Rejected) The pipe section of Claim 43, in which said pipe section includes a central liner element forming a generally straight internal diameter of said pipe section.

49. (Rejected) A pipe section, said pipe section including a generally longitudinal axis parallel to the flowpath through the pipe section; said pipe section further including a generally sinusoidal exterior surface such that, in section view along the length of the longitudinal axis, said exterior surface forms a generally sinusoidal pattern of alternating similarly-shaped and similarly-sized (a) rung elements and (b) valley portions; said valley portions generally spacing said rung elements from one another longitudinally with respect to the pipe section's longitudinal axis; said rung elements generally formed in cross section by a central portion lying generally parallel to the valley portion and spaced radially outwardly therefrom, said central portion having in cross section first and second opposing edges spaced longitudinally from each other along the longitudinal axis, said rung elements further generally formed in cross section by first and second leg portions, each leg portion respectively connecting the corresponding edge of the rung central portion to an adjacent valley; said

pipe section terminated generally at each of its two ends with a male end formed generally by a rung element.

50. (Rejected) Apparatus for joining a plurality of pieces of pipe, including:

a first piece of pipe and a second piece of pipe each having a similar size and shape sidewall corrugation pattern along their lengths, and each including a generally longitudinal axis parallel to the flowpath through the respective pipe pieces;

the sidewall corrugation of each of said pipe pieces comprising a generally sinusoidal exterior surface such that, in section view along the length of the longitudinal axis, said exterior surface forms a generally sinusoidal pattern of alternating similarly-shaped and similarly-sized (a) rung elements and (b) valley portions; said valley portions generally spacing said rung elements from one another longitudinally with respect to the pipe piece's longitudinal axis; said rung elements generally formed in cross section by a central portion lying generally parallel to the valley portion and spaced radially outwardly therefrom, said central portion having in cross section first and second opposing edges spaced longitudinally from each other along the longitudinal axis, said rung elements further generally formed in cross section by first and second leg portions, each leg portion

respectively connecting the corresponding edge of the rung central portion to an adjacent valley;

a male engagement structure at one end of the second piece of pipe, said male structure formed from the sidewall corrugation pattern of the second piece of pipe,

a first female structure formed from the sidewall corrugation pattern of the first piece of pipe at one end of the pipe, said female flange comprising a portion of a rung including the rung's central portion, said female flange configured to receive the male engagement structure of the second pipe piece by being temporarily deformed for receiving the male structure, the temporary deformation being both sufficiently large to permit the insertion of the male structure but also sufficiently small to ensure that material memory returns the first female structure toward its original non-deformed configuration with sufficient compressive force to grip the male structure and prevent its inadvertent removal from engagement with the first female structure.

51. (Rejected) The apparatus of Claim 3, in which the first female engagement structure constitutes a continuation of the generally sinusoidal pattern of the sidewall corrugation generally without the portion of the

pattern transitioning between the radially more distant portion of the corrugation pattern and the radially less distant portion of the corrugation pattern and without the portion of the internal non-corrugated liner element that would otherwise underlie the radially more distant portion of the corrugation pattern.

52. (Rejected) The apparatus of Claim 3, in which the confronting ends of the respective internal non-corrugated liner elements of the respective pieces of pipe generally form a butt joint with each other, said butt joint providing a substantially smooth interior transition surface longitudinally between the respective pipe elements.

53. (Rejected) The apparatus of Claim 3, further including a sealing gasket located between the confronting ends of the respective internal non-corrugated liner elements of the respective pieces of pipe.

## **(b) CLAIM SUPPORT AND DRAWING ANALYSIS SECTION**

### CLAIM SUPPORT

#### Claim 2

Apparatus for joining a plurality of pieces of pipe {**page 1, lines 3-6; page 15, lines 17-19**}, including:

a first piece of pipe and a second piece of pipe each having a similar size and shape sidewall corrugation pattern along their lengths {**page 6, lines 6-9; lines 18-20; page 9, lines 10-12; page 13, lines 9-11**}, said corrugation including a generally repeating sinusoidal pattern in cross section having alternating portions (a) radially more distant from a longitudinal centerline of the pipe and (b) radially less distant from that centerline {**page 6, lines 6-9, and lines 18-20; page 5, line 13**};

a male engagement structure formed from the sidewall corrugation pattern of the first piece of pipe, said male engagement structure terminating longitudinally at a location along the corrugation pattern that is generally within the radially less distant portion of the corrugation pattern {**page 13, lines 13-14**}; and

a first female engagement structure formed from the sidewall corrugation pattern of the second piece of pipe, said female engagement structure

terminating longitudinally with a generally open end for receiving the male engagement structure, said termination occurring at a location along the corrugation pattern that is generally within the radially more distant portion of the corrugation pattern {**page 13, lines 14-17**}, the first female structure being temporarily deformable to receive the male structure, the temporary deformation being both sufficiently large to permit the insertion of the male structure but also sufficiently small to ensure that material memory returns the first female structure toward its original non-deformed configuration with sufficient compressive force to grip the male structure and to help prevent its inadvertent removal from engagement with the first female structure {**page 1, lines 4-6; page 6, lines 6-15; page 13, lines 2-8; page 14, lines 1-5; page 23, lines 1-5 and lines 6-9**}.

#### Claim 43

A pipe section, said pipe section including a generally longitudinal axis parallel to the flowpath through the pipe section {**page 1, lines 8-10; page 15, lines 14-19**}; said pipe section further including a generally sinusoidal exterior surface such that, in section view along the length of the longitudinal axis, said exterior surface forms a generally sinusoidal pattern

of alternating similarly-shaped and similarly-sized (a) rung elements and (b) valley portions {**page 1, line 8; page 6, lines 6-9 and lines 18-20; page 13, lines 9-11; page 24, lines 1-2**}; said valley portions generally spacing said rung elements from one another longitudinally with respect to the pipe section's longitudinal axis; said rung elements generally formed in cross section by a central portion lying generally parallel to the valley portion and spaced radially outwardly therefrom, said central portion having in cross section first and second opposing edges spaced longitudinally from each other along the longitudinal axis, said rung elements further generally formed in cross section by first and second leg portions, each leg portion respectively connecting the corresponding edge of the rung central portion to an adjacent valley {**page 24, lines 1-2**};

a female flange portion at one end of the pipe section {**page 13, lines 14-15**}, said female flange comprising a portion of a rung including the rung's central portion {**page 13, lines 16-17**}, said female flange configured to receive a similarly sized and shaped rung element on the end of a similar second pipe section {**page 6, lines 6-15; page 10, lines 9-15; page 13, lines 9-10 and lines 14-17; page 14, lines 1-5; page 23, lines 6-9**}.



Claim 49

A pipe section, said pipe section including a generally longitudinal axis parallel to the flowpath through the pipe section {**page 1, lines 8-10; page 15, lines 14-19**}; said pipe section further including a generally sinusoidal exterior surface such that, in section view along the length of the longitudinal axis, said exterior surface forms a generally sinusoidal pattern of alternating similarly-shaped and similarly-sized (a) rung elements and (b) valley portions {**page 1, line 8; page 6, lines 6-9 and lines 18-20; page 13, lines 9-11; page 24, lines 1-2**}; said valley portions generally spacing said rung elements from one another longitudinally with respect to the pipe section's longitudinal axis; said rung elements generally formed in cross section by a central portion lying generally parallel to the valley portion and spaced radially outwardly therefrom, said central portion having in cross section first and second opposing edges spaced longitudinally from each other along the longitudinal axis, said rung elements further generally formed in cross section by first and second leg portions, each leg portion respectively connecting the corresponding edge of the rung central portion to an adjacent valley {**page 24, lines 1-2**};

said pipe section terminated generally at each of its two ends with a male end formed generally by a rung element {**page 13, lines 13-14; page 15, lines 15-17**}.

Claim 50

Apparatus for joining a plurality of pieces of pipe {**page 1, lines 3-6; page 15, lines 17-19**}, including:

a first piece of pipe and a second piece of pipe each having a similar size and shape sidewall corrugation pattern along their lengths {**page 1, line 8; page 6, lines 6-9 and lines 18-20; page 9, lines 10-12; page 13, lines 9-11**}, and each including a generally longitudinal axis parallel to the flowpath through the respective pipe pieces {**page 1, lines 8-10; page 15, lines 14-19**};

the sidewall corrugation of each of said pipe pieces comprising a generally sinusoidal exterior surface such that, in section view along the length of the longitudinal axis said exterior surface forms a generally sinusoidal pattern of alternating similarly-shaped and similarly-sized (a) rung elements and (b) valley portions {**page 1, line 8; page 6, lines 6-9 and lines 18-20; page 13, lines 9-11; page 24, lines 1-2**}; said valley portions generally spacing said rung elements from one another longitudinally with respect to the pipe

piece's longitudinal axis; said rung elements generally formed in cross section by a central portion lying generally parallel to the valley portion and spaced radially outwardly therefrom, said central portion having in cross section first and second opposing edges spaced longitudinally from each other along the longitudinal axis, said rung elements further generally formed in cross section by first and second leg portions, each leg portion respectively connecting the corresponding edge of the rung central portion to an adjacent valley {**page 24, lines 1-2**};

a male engagement structure at one end of the second piece of pipe, said male structure formed from the sidewall corrugation pattern of the second piece of pipe {**page 13, line 13-14**},

a first female structure formed from the sidewall corrugation pattern of the first piece of pipe at one end of the pipe, said female flange comprising a portion of a rung including the rung's central portion {**page 13, lines 14-17**}, said female flange configured to receive the male engagement structure of the second pipe piece by being temporarily deformed for receiving the male structure, the temporary deformation being both sufficiently large to permit the insertion of the male structure but also sufficiently small to ensure that material memory returns the first female structure toward its original

non-deformed configuration with sufficient compressive force to grip the male structure and prevent its inadvertent removal from engagement with the first female structure {**page 1, lines 4-6; page 6, lines 6-15; page 13, lines 2-8; page 14, lines 1-5; page 23, lines 1-5 and lines 6-9**}.

## DRAWING ANALYSIS

### Claim 2

Apparatus for joining a plurality of pieces of pipe, including:

a first piece of pipe and a second piece of pipe each having a similar size and shape sidewall corrugation pattern along their lengths {**Figs. 1, 4 and 8, Reference Numerals 12 and 14**}, said corrugation including a generally repeating sinusoidal pattern in cross section having alternating portions (a) radially more distant from a longitudinal centerline of the pipe and (b) radially less distant from that centerline {**Figs. 2-3, Reference Numerals 12 and 14**};

a male engagement structure formed from the sidewall corrugation pattern of the first piece of pipe {**Figs. 2-3, male end at Reference Numeral 24**}, said male engagement structure terminating longitudinally at a location along the corrugation pattern that is generally within the radially less distant portion of the corrugation pattern {**Figs. 2-3, Reference Numeral 24**}; and

a first female engagement structure formed from the sidewall corrugation pattern of the second piece of pipe {**Figs. 2-3, female end at Reference Numerals 28 and 30**}, said female engagement structure terminating longitudinally with a generally open end for receiving the male engagement

structure {**Figs. 2-3, Reference Numeral 28**}, said termination occurring at a location along the corrugation pattern that is generally within the radially more distant portion of the corrugation pattern {**Figs. 2-3, Reference Numeral 28**}, the first female structure being temporarily deformable to receive the male structure, the temporary deformation being both sufficiently large to permit the insertion of the male structure but also sufficiently small to ensure that material memory returns the first female structure toward its original non-deformed configuration with sufficient compressive force to grip the male structure and to help prevent its inadvertent removal from engagement with the first female structure {**Figs. 2-3, at Reference Numeral 28; Figs. 5-6, at Reference Numeral 14**}.

Claim 43

A pipe section, said pipe section including a generally longitudinal axis parallel to the flowpath through the pipe section {**Fig. 1, 4, and 8, Reference Numerals 12 and 14**}; said pipe section further including a generally sinusoidal exterior surface such that, in section view along the length of the longitudinal axis, said exterior surface forms a generally sinusoidal pattern of alternating similarly-shaped and similarly-sized (a)

rung elements and (b) valley portions {**Figs. 2-3, Reference Numerals 20 and 22**}; said valley portions generally spacing said rung elements from one another longitudinally with respect to the pipe section's longitudinal axis; said rung elements generally formed in cross section by a central portion lying generally parallel to the valley portion and spaced radially outwardly therefrom, said central portion having in cross section first and second opposing edges spaced longitudinally from each other along the longitudinal axis, said rung elements further generally formed in cross section by first and second leg portions, each leg portion respectively connecting the corresponding edge of the rung central portion to an adjacent valley {**Figs. 2-3, Reference Numerals 20 and 22**};

a female flange portion at one end of the pipe section {**Figs. 2-3, Reference Numeral 28**}, said female flange comprising a portion of a rung including the rung's central portion, said female flange configured to receive a similarly sized and shaped rung element on the end of a similar second pipe section {**Figs. 2-3, Reference Numerals 22 and 28**}.

Claim 49

A pipe section, said pipe section including a generally longitudinal axis parallel to the flowpath through the pipe section {**Fig. 1, 4, and 8, Reference Numerals 12 and 14**}; said pipe section further including a generally sinusoidal exterior surface such that, in section view along the length of the longitudinal axis, said exterior surface forms a generally sinusoidal pattern of alternating similarly-shaped and similarly-sized (a) rung elements and (b) valley portions {**Figs. 2-3, Reference Numerals 20 and 22**}; said valley portions generally spacing said rung elements from one another longitudinally with respect to the pipe section's longitudinal axis; said rung elements generally formed in cross section by a central portion lying generally parallel to the valley portion and spaced radially outwardly therefrom, said central portion having in cross section first and second opposing edges spaced longitudinally from each other along the longitudinal axis, said rung elements further generally formed in cross section by first and second leg portions, each leg portion respectively connecting the corresponding edge of the rung central portion to an adjacent valley {**Figs. 2-3, Reference Numerals 20 and 22**}; said pipe section terminated generally at each of its two ends with a male end formed generally by a rung element {**Fig. 1, Reference Numeral 12**}.



Claim 50

Apparatus for joining a plurality of pieces of pipe, including:

a first piece of pipe and a second piece of pipe each having a similar size and shape sidewall corrugation pattern along their lengths {**Figs. 1, 4 and 8,**

**Reference Numerals 12 and 14**}, and each including a generally

longitudinal axis parallel to the flowpath through the respective pipe pieces {

**Fig. 1, 4, and 8, Reference Numerals 12 and 14**}; the sidewall corrugation of each of said pipe pieces comprising a generally sinusoidal exterior surface such that, in section view along the length of the longitudinal axis, said exterior surface forms a generally sinusoidal pattern of alternating similarly-shaped and similarly-sized (a) rung elements and (b) valley portions {**Figs.**

**2-3, Reference Numerals 20 and 22**}; said valley portions generally

spacing said rung elements from one another longitudinally with respect to

the pipe piece's longitudinal axis; said rung elements generally formed in

cross section by a central portion lying generally parallel to the valley

portion and spaced radially outwardly therefrom, said central portion having

in cross section first and second opposing edges spaced longitudinally from

each other along the longitudinal axis, said rung elements further generally

formed in cross section by first and second leg portions, each leg portion

respectively connecting the corresponding edge of the rung central portion to an adjacent valley {**Figs. 2-3, Reference Numerals 20 and 22**};

a male engagement structure at one end of the second piece of pipe, said male structure formed from the sidewall corrugation pattern of the second piece of pipe {**Figs. 2-3, male end at Reference Numeral 24**},

a first female structure formed from the sidewall corrugation pattern of the first piece of pipe at one end of the pipe {**Figs. 2-3, female end at Reference Numerals 28 and 30**}, said female flange comprising a portion of a rung including the rung's central portion {**Figs. 2-3, Reference Numeral 28**}, said female flange configured to receive the male engagement structure of the second pipe piece by being temporarily deformed for receiving the male structure, the temporary deformation being both sufficiently large to permit the insertion of the male structure but also sufficiently small to ensure that material memory returns the first female structure toward its original non-deformed configuration with sufficient compressive force to grip the male structure and prevent its inadvertent removal from engagement with the first female structure {**Figs. 2-3, at Reference Numeral 28; Figs. 5-6, at Reference Numeral 14**}.

**(c) MEANS OR STEP PLUS FUNCTION ANALYSIS SECTION**

Appellant submits that none of the claims invoke 35 U.S.C. §112, sixth paragraph, since there are no means-(or step) plus function claim elements.

**(d) EVIDENCE SECTION**

AFFIDAVITS AND DECLARATIONS UPON WHICH THE  
APPELLANT RELIED BEFORE THE EXAMINER

None

OTHER EVIDENCE UPON WHICH THE APPELLANT RELIED  
BEFORE THE EXAMINER

- Fochler, U.S. Patent No. 3,330,303, July 11, 1967
- Graves, U.S. Patent No. 6,416,667, July 9, 2002

EVIDENCE RELIED UPON BY THE APPELLANT AND ADMITTED  
INTO THE FILE PURSUANT TO 37 C.F.R.41.33(d)

None

**(e) RELATED CASES SECTION**

None